Name:

at1118paper: Complete the Square (v418)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 60x = -644$$

Add $\left(\frac{-60}{2}\right)^2$, which equals 900, to both sides of the equation.

$$x^2 - 60x + 900 = 256$$

Factor the left side.

$$(x - 30)^2 = 256$$

Undo the squaring. We need to consider both $\pm\sqrt{256}$.

$$x - 30 = -16 \quad \text{or} \quad x - 30 = 16$$
$$x = 14 \quad \text{or} \quad x = 46$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 28x = -132$$

$$x^2 + 28x + 196 = 64$$
$$(x + 14)^2 = 64$$
$$x + 14 = \pm 8$$
$$x = -22 \quad \text{or} \quad x = -6$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 6x = 160$$

$$x^2 + 6x + 9 = 169$$
$$(x + 3)^2 = 169$$
$$x + 3 = \pm 13$$
$$x = -16 \quad \text{or} \quad x = 10$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 50x = -624$$

$$x^2 - 50x + 625 = 1$$
$$(x - 25)^2 = 1$$
$$x - 25 = \pm 1$$
$$x = 24 \quad \text{or} \quad x = 26$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 - 36x = -260$$

$$x^2 - 36x + 324 = 64$$
$$(x - 18)^2 = 64$$
$$x - 18 = \pm 8$$
$$x = 10 \quad \text{or} \quad x = 26$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 + 58x = -552$$

$$x^2 + 58x + 841 = 289$$
$$(x + 29)^2 = 289$$
$$x + 29 = \pm 17$$
$$x = -46 \quad \text{or} \quad x = -12$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 - 48x = -567$$

$$x^2 - 48x + 576 = 9$$
$$(x - 24)^2 = 9$$
$$x - 24 = \pm 3$$
$$x = 21 \quad \text{or} \quad x = 27$$